

Claims

1. A solid catalyst component for olefin polymerization, which is obtained by contacting a solid catalyst component precursor(C) containing a magnesium atom, a titanium atom and a hydrocarbyloxy group, with a halogeno compound(A) of the 13(IIIa) or 14(IVa) group of elements in the periodic table of the elements, and an electron donor(B).

10 2. The solid catalyst component according to Claim 1, wherein the halogeno compound(A) is a compound represented by the following formula,

$MR_{m-a}X_a$

wherein M is an atom belonging to the 13(IIIa) or 14(IVa) group of elements in the periodic table of the elements, R is a hydrocarbon group having 1 to 20 carbon atoms, X is a halogen atom, m is a valence of M, and "a" is a number satisfying  $0 < a \leq m$ .

20 3. The solid catalyst component according to Claim 1, wherein the halogeno compound(A) is a compound represented by the following formula,

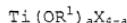


wherein R is a hydrocarbon group having 1 to 20 carbon atoms, X is a halogen atom, and "a" is a number satisfying  $0 < a \leq 4$ .

4. The solid catalyst component according to Claim 1,  
wherein the electron donor(B) is an organic acid ester or an  
ether.

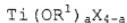
5 5. The solid catalyst component according to Claim 1,  
wherein the electron donor(B) is a dialkyl ester of a phthalic  
acid.

6. The solid catalyst component according to Claim 1,  
10 wherein the solid catalyst component precursor(C) is a  
trivalent titanium atom-containing solid product obtained by  
reducing a titanium compound(2) represented by the following  
formula,



15 wherein R<sup>1</sup> is a hydrocarbon group having 1 to 20 carbon atoms,  
X is a halogen atom, and "a" is a number satisfying  $0 < a \leq 4$ ,  
with an organomagnesium compound(3) in the presence of an  
organosilicon compound(1) having an Si-O bond.

20 7. The solid catalyst component according to Claims 1,  
wherein the solid catalyst component precursor(C) is a  
trivalent titanium atom-containing solid product obtained by  
reducing a titanium compound(2) represented by the following  
formula,



25 wherein R<sup>1</sup> is a hydrocarbon group having 1 to 20 carbon atoms,  
X is a halogen atom, and "a" is a number satisfying  $0 < a \leq 4$ ,

with an organomagnesium compound(3) in the presence of an organosilicon compound(1) having an Si-O bond and a porous carrier(4).

5 8. The solid catalyst component according to Claim 7,  
wherein the porous carrier(4) is an organic porous polymer.

9. A catalyst for olefin polymerization, which comprises  
an organoaluminum compound(II) and a solid catalyst  
10 component(I) for olefin polymerization, which is obtained by  
contacting a solid catalyst component precursor(C) containing  
a magnesium atom, a titanium atom and a hydrocarbyloxy group,  
with a halogeno compound(A) of the 13(IIIa) or 14(IVa) group of  
elements in the periodic table of the elements, and an electron  
15 donor(B).

10. A process for producing an olefin polymer, which  
comprises polymerizing an olefin with a catalyst for olefin  
polymerization, which comprises an organoaluminum  
20 compound(II) and a solid catalyst component(I) for olefin  
polymerization, which is obtained by contacting a solid  
catalyst component precursor(C) containing a magnesium atom,  
a titanium atom and a hydrocarbyloxy group, with a halogeno  
compound(A) of the 13(IIIa) or 14(IVa) group of elements in the  
25 periodic table of the elements, and an electron donor(B).

11. The process according to Claim 10, wherein the olefin

polymer is a copolymer of ethylene with an  $\alpha$ -olefin.

12. A solid catalyst component for olefin polymerization, which is obtained by contacting an intermediate product with  
5 a compound(D) having a titanium-halogen bond, the intermediate product being obtained by contacting:  
a solid catalyst component precursor(C) containing a magnesium atom, titanium atom and a hydrocarbyloxy group,  
with a halogeno compound(A') of the 14(IVa) group of elements  
10 in the periodic table of the elements and an electron donor(B).

13. The solid catalyst component according to Claim 12, wherein the halogeno compound(A') is a compound represented by the following formula,



wherein M is an atom belonging to the 14(IVa) group of elements in the periodic table of the elements , R is a hydrocarbon group having 1 to 20 carbon atoms, X is a halogen atom, m is a valence of M, and "a" is a number satisfying  $0 < a \leq m$ .

14. The solid catalyst component according to Claim 12, wherein the halogeno compound(A') is a compound represented by the following formula,



25 wherein R is a hydrocarbon group having 1 to 20 carbon atoms, X is a halogen atom, and "a" is a number satisfying  $0 < a \leq 4$ .

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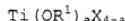
15. The solid catalyst component according to Claims 12,  
wherein the electron donor(B) is an organic acid ester or an  
ether.

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16. The solid catalyst component according to Claims 12,  
wherein the electron donor(B) is a dialkyl ester of a phthalic  
acid.

10 17. The solid catalyst component according to Claim 12,  
wherein the solid catalyst component precursor(C) is a  
trivalent titanium atom-containing solid product obtained by  
reducing a titanium compound(2) represented by the following  
formula,

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wherein  $\text{R}^1$  is a hydrocarbon group having 1 to 20 carbon atoms,  
 $\text{X}$  is a halogen atom, and "a" is a number satisfying  $0 < a \leq 4$ ,  
with an organomagnesium compound(3) in the presence of an  
organosilicon compound(1) having an Si-O bond.

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18. The solid catalyst component according to Claims 12,  
wherein the solid catalyst component precursor(C) is a  
trivalent titanium atom-containing solid product obtained by  
reducing a titanium compound(2) represented by the following  
25 formula,



wherein  $\text{R}^1$  is a hydrocarbon group having 1 to 20 carbon atoms,

X is a halogen atom, and "a" is a number satisfying  $0 < a \leq 4$ , with an organomagnesium compound(3) in the presence of an organosilicon compound(1) having an Si-O bond and a porous carrier(4).

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19. The solid catalyst component according to Claim 18, wherein the porous carrier(4) is an organic porous polymer.

20. A catalyst for olefin polymerization, which comprises  
10 an organoaluminum compound(II) and a solid catalyst  
component(I') for olefin polymerization, which is obtained by  
contacting an intermediate product with a compound(D) having  
a titanium-halogen bond, the intermediate product being  
obtained by contacting:  
15 a solid catalyst component precursor(C) containing a  
magnesium atom, titanium atom and a hydrocarbyloxy group,  
with a halogeno compound(A') of the 14(IVa) group of elements  
in the periodic table of the elements and an electron donor(B).

20 21. A process for producing an olefin polymer, which  
comprises polymerizing an olefin with a catalyst for olefin  
polymerization, which comprises an organoaluminum  
compound(II) and a solid catalyst component(I') for olefin  
polymerization, which is obtained by contacting an  
25 intermediate product with a compound(D) having a  
titanium-halogen bond, the intermediate product being  
obtained by contacting:

a solid catalyst component precursor(C) containing a magnesium atom, titanium atom and a hydrocarbyloxy group, with a halogeno compound(A') of the 14(IVa) group of elements in the periodic table of the elements and an electron donor(B).

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22. The process according to Claim 21, wherein the olefin polymer is a copolymer of ethylene with an  $\alpha$ -olefin.

23. A solid catalyst component for olefin polymerization comprising a magnesium atom, a titanium atom, a halogen atom and an electron donor, and having a relative surface area of 10  $30\text{ m}^2/\text{g}$  or less.

24. The solid catalyst component according to Claim 23, which comprises the electron donor in an amount of about 10 wt% or more.

25. The solid catalyst component according to Claims 23, wherein the electron donor(B) is an organic acid ester.

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26. The solid catalyst component according to Claims 23, wherein the electron donor(B) is a dialkyl ester of a phthalic acid.

25 27. A catalyst for olefin polymerization, which comprises an organoaluminum compound(II) and a solid catalyst

component(I'') for olefin polymerization comprising a magnesium atom, a titanium atom, a halogen atom and an electron donor, and having a relative surface area of 30 m<sup>2</sup>/g or less.

5 28. A process for producing an olefin polymer, which comprises polymerizing an olefin with a catalyst for olefin polymerization, which comprises an organoaluminum compound(II) and a solid catalyst component(I'') for olefin polymerization comprising a magnesium atom, a titanium atom, 10 a halogen atom and an electron donor, and having a relative surface area of 30 m<sup>2</sup>/g or less.

29. The process according to Claim 28, wherein the olefin polymer is a copolymer of ethylene with an  $\alpha$ -olefin.

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